

CLAIMS

1. A composite comprising a sandwich structure comprising at least two surface layers attached to a central layer of rigid epoxy foam wherein the layer of epoxy foam is at least 1.5 times the combined thickness of the two surface layers and the foam has a density of from 0.2 to 1.5 gram/cc.
2. A composite according to claim 1 in which the foam has a density of between 0.4 and 1.5 gram/cc.
3. A composite according to claim 1 or claims 2 in which the foam has a density of 0.3 to 0.6 gram/cc.
4. A composite comprising at least two surface layers each layer having a thickness of from 0.2 to 10 millimetres and a core layer of a rigid epoxy foam having a thickness of from 2 to 200 millimetres.
5. A composite according to any of the preceding claims having a flexural modulus as measured by ASTM D790/ISO 178 from 200 mPa to 700 mPa.
6. A composite according to any of the preceding claims in which the surface layers are of metal foil such as aluminium or steel foil, plastic film or sheeting such as polypropylene or polyethylene film or polyethylene terephthalate film
7. A composite according to any of the preceding claims in which the surface layers are porous.
8. A composite according to any of claims 1 to 5 and 7 in which the surface layers are fibrous.
9. A composite according to claims 8 in which the fibres are carbon fibre, glass fibre or Kevlar.
10. A composite according to any of the preceding claims having a density of from 0.1 to 1 gram/cc.

11. A composite according to any of the preceding claims in which the surface layers are matching internal and external structures.
12. A composite according to claim 11 in which the structures are hollow box sections.
13. A composite according to claim 11 in which the structures are tubes.
14. A composite according to claim 13 in which the tubes are concentric.
15. A composite according to any of claims 11 to 14 in which the surface layers are of metal.
16. A composite according to claim 15 in which the metal is aluminium.
17. A composite according to any of the preceding claims in which the surface layers are of different materials.
18. The use of a composite according to any of the preceding claims to provide structures in the construction or transportation industries.
19. The use according to claim 18 to provide reinforcement against crash in vehicles.
20. The use according to claim 19 to provide automobile door reinforcement.
21. The use of a composite according to any of claims 1 to 17 to provide strength in sporting goods.
22. A process for the production of composite materials comprising providing a first surface layer, laying a layer of heat activatable foamable epoxy material thereon and providing a second surface layer on the surface of the layer of heat activatable foamable epoxy material remote from the first layer of fibrous material and heat activating the epoxy material so that it foams and bonds to the surface layers.

23. A process for the production of composite materials comprising spraying a foamable epoxy material between two surface layers and allowing the foamable material to expand and cure and bond to the surface layers.
- 5 24. A process according to claim 22 or claim 23 in which the surface layers are porous and are coated and/or impregnated with an epoxy material.
25. A process according to claim 24 in which the epoxy material is compatible with the heat activatable foamable epoxy material.
- 10 26. A process according to claim 25 in which the epoxy material cures under the same conditions as the heat activatable material cures.
- 15 27. A process according to any of claims 24 to 26 in which the porous layers are coated and/or impregnated with the same epoxy material as forms the basis for the heat activated foamable material.
- 20 28. A process according to any of claims 22 to 27 wherein the first surface layer is the outer surface of the inner component of matching structures.
- 25 29. A process according to claim 28 wherein the first surface layer is the outer surface of the inner of two concentric tubes and the second surface is the inner surface of the outer tube.
- 30 30. A process according to claim 28 wherein the first surface is the outer surface of an inner box section and the second surface is the inner surface of an outer box section.
31. A process according to any of claims 28 to 30 in which the matching structures are held apart to allow the foaming of the epoxy material.